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Fractures and dislocation charts.

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FRACTURES AND DISLOCATION CHARTS

IN COLORS

Compliments of
BATTLE & COMPANY
Chemists' Corporation
ST. LOUIS, MO.

FRACTURE OF FEMUR
BELOW TROCHANTERS.

a. Rectus.
b. Adductors.
c. Biceps.
d. Psoas and Iliacus.
e. Pyriformis.
f. Semi-membranosus.
g. Semi-tendinosus.
h. Quadratus femoris.
i. Psoas.
k. Symphysis pubis.

Fracture of the Femur Just Below the Trochanters

In this fracture the upper fragment is tilted forward and everted by the combined action of the Psoas and Iliacus, and, at the same time, is farther everted and drawn outward by the External rotator muscles of the thigh. The lower fragment is drawn upward by the Rectus in front, and the Biceps, Semimembranosus, Semitendinosus and Gracilis behind, and, at the same time, is rotated, and the upper end tilted outward and the lower end drawn inward by the Adductor muscles.

This displacement causes a marked prominence at the upper and outer side of the thigh, with shortening and eversion of the limb. It may be reduced and retained by three different methods: The relaxation of all the opposing muscles by securing the limb on a double inclined plane, overcoming the contraction of the muscles by continued extension, as in Buck's extension or the plaster cast, or by the union of these two principles in the use of Hodgen's suspension splint.

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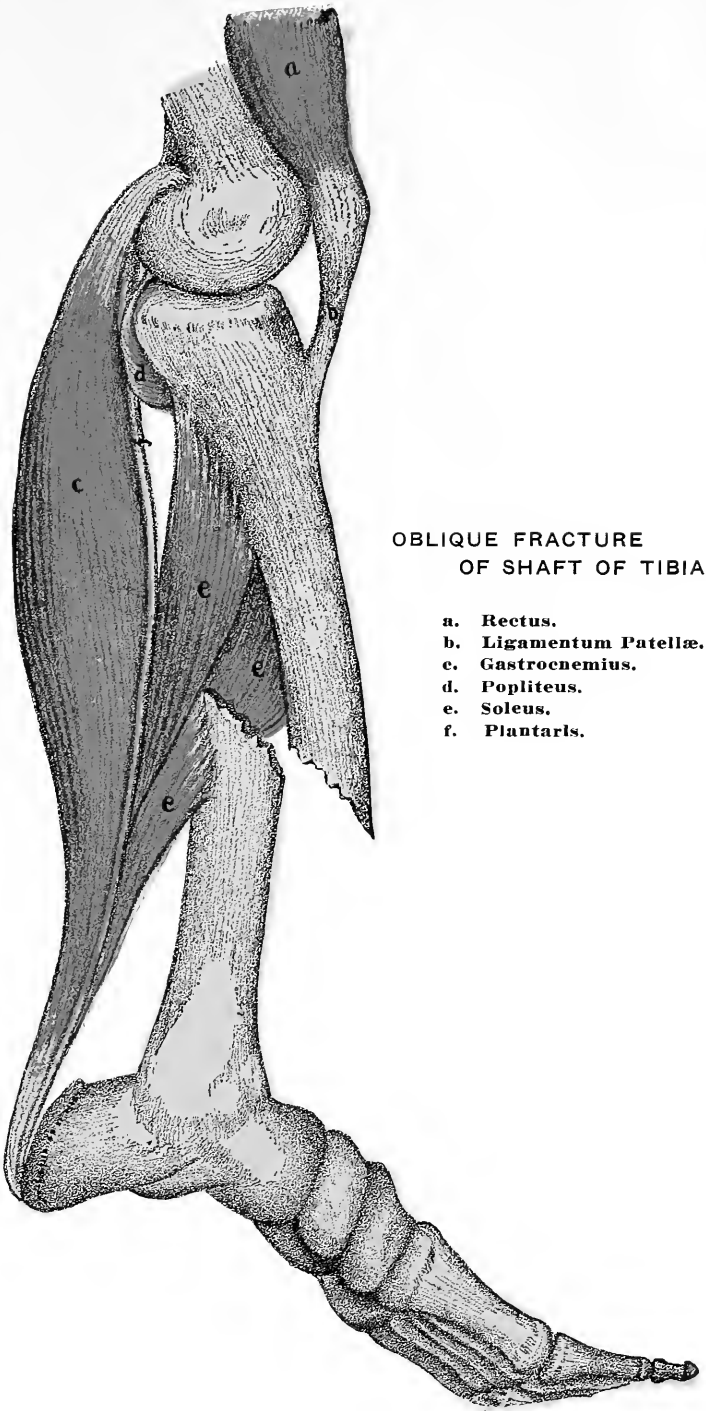

OBLIQUE FRACTURE
OF SHAFT OF TIBIA.

a. Rectus.
b. Ligamentum Patellæ.
c. Gastrocnemius.
d. Popliteus.
e. Soleus.
f. Plantaris.

Oblique Fracture of the Shaft of the Tibia

In this fracture the form of displacement depends on the direction of the line of fracture. If it is downward and forward, as represented, the fragments overlap, the lower fragment being drawn backward and upward by the action of the Gastrocnemius and Soleus muscles, while the pointed extremity of the upper fragment projects forward immediately beneath the integument, often protruding through it and rendering the fracture a compound one. If it is the reverse of that represented, the pointed extremity of the lower fragment projects forward, overlapping the lower extremity of the upper one. The fragments are brought in opposition by extension and counter-extension, preferably while the muscles are relaxed by the semi-flexion of the knee, it often being necessary in compound fractures to remove a part of the protruding bone before complete adaptation can be effected.

The fragments are retained in position by means of the plaster cast, lateral splints or the fracture box. The knee should be immobilized, but continued extension from the foot is seldom necessary.

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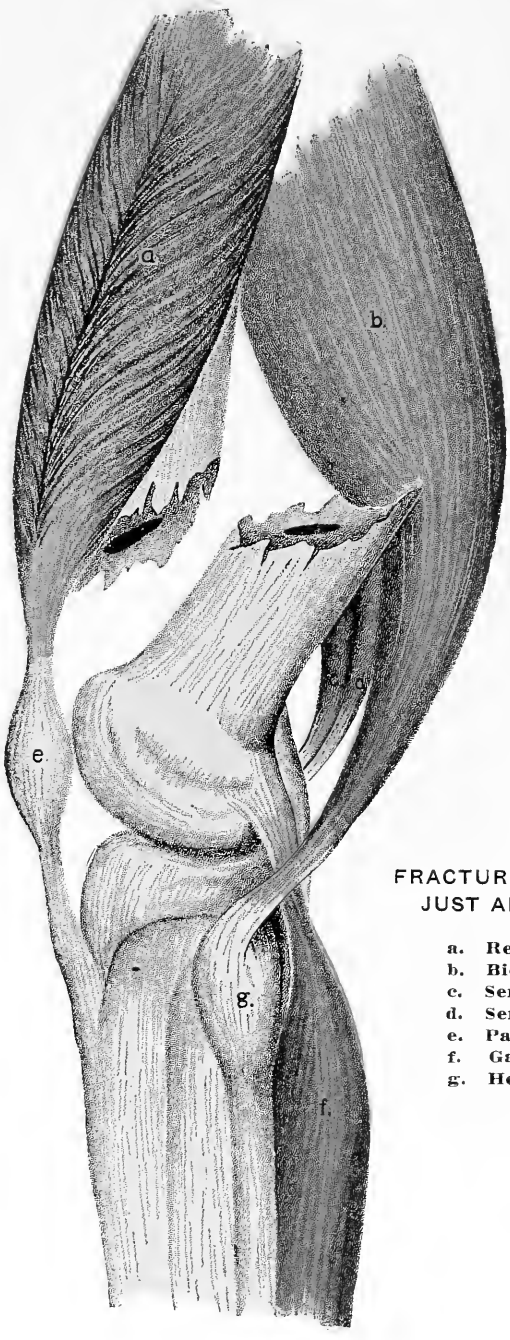

FRACTURE OF FEMUR
JUST ABOVE CONDYLES.

a. Rectus.
b. Biceps.
c. Semimembranosus.
d. Semitendinosus.
e. Patella.
f. Gastrocnemius.
g. Head of Fibula.

Fracture of the Femur Just Above the Condyles

A rather serious injury and attended by considerable displacement. The lower fragment is carried backward deeply into the popliteal space by the powerful action of the Gastrocnemius and Plantaris (?) muscles, and at the same time upward by the Rectus, Biceps, Semimembranosus and Semitendinosus. The pointed end of the upper fragment is drawn inward by the Pectineus and Adductor muscles, and tilted forward by the Psoas and Iliacus. Reduction is best effected by the double inclined plane, or by continued traction from the ankle joint. Great care should be exercised in securing apposition of the fragments in order to avoid the pinching of a portion of the Rectus muscles between the fragments. Immobilization, once reduction is made, is accomplished by one of the regular methods.

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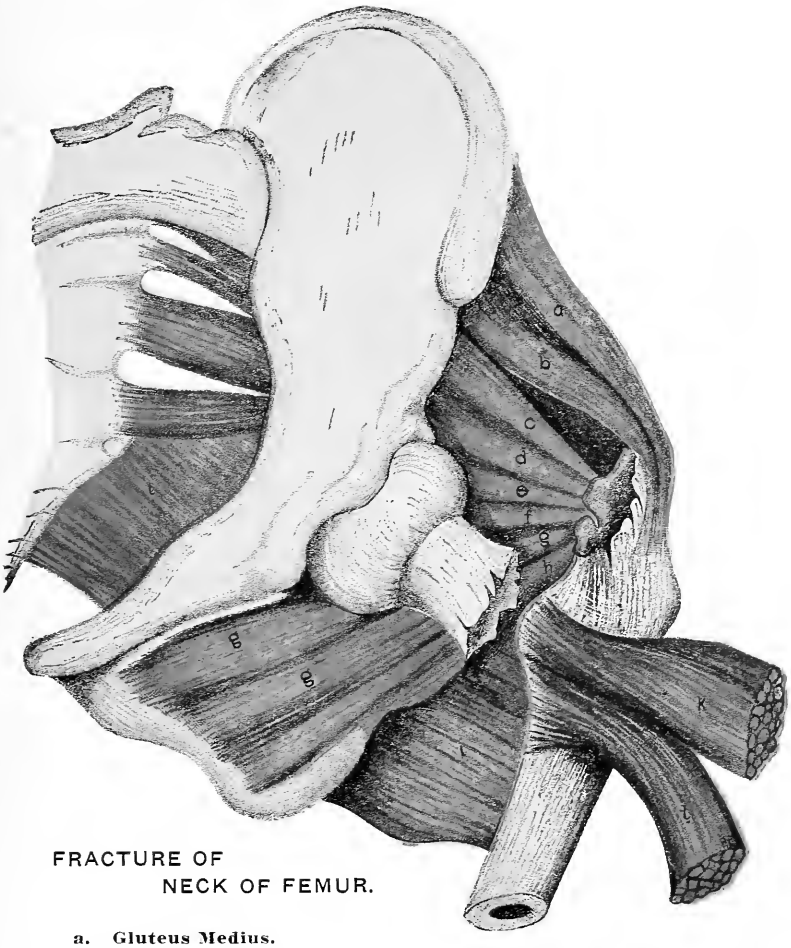

FRACTURE OF
NECK OF FEMUR.

a. Gluteus Medius.
b. Gluteus Minimus.
c. Pyriformis.
d. Gemellus Superior.
e. Obturator Internus.
f. Gemellus Inferior.
g. Obturator Externus.
h. Quadratus Femoris.
i. Gluteus Maximus.
k. Psoas.
l. Iliacus.

Fracture of Neck of Femur

In this the characteristic marks are slight shortening of the limb and eversion of the foot. Eversion is caused by the weight of the limb rotating it outward. Shortening is produced by the action of the Glutei muscles, the Rectus, Biceps, Semimembranosus and Semitendinosus. Posterior displacement is effected by the Gemelli, Obturator and other rotators. This fracture is more frequent in old age than in young or early adult life. Treatment is as follows: Only so much of the shortening as can be effected by moderate traction should be made, as complete reduction is liable to break up a possible impaction that would be valuable in securing union. Traction by Buck's extension with a weight of from five to ten pounds prevents further shortening and promotes comfort, while small sand bags placed around the pelvis and limb further aid in securing immobility. If possible, a well applied plaster dressing is recommended by the best authorities, and should be worn for two months, if the patient's condition will permit.

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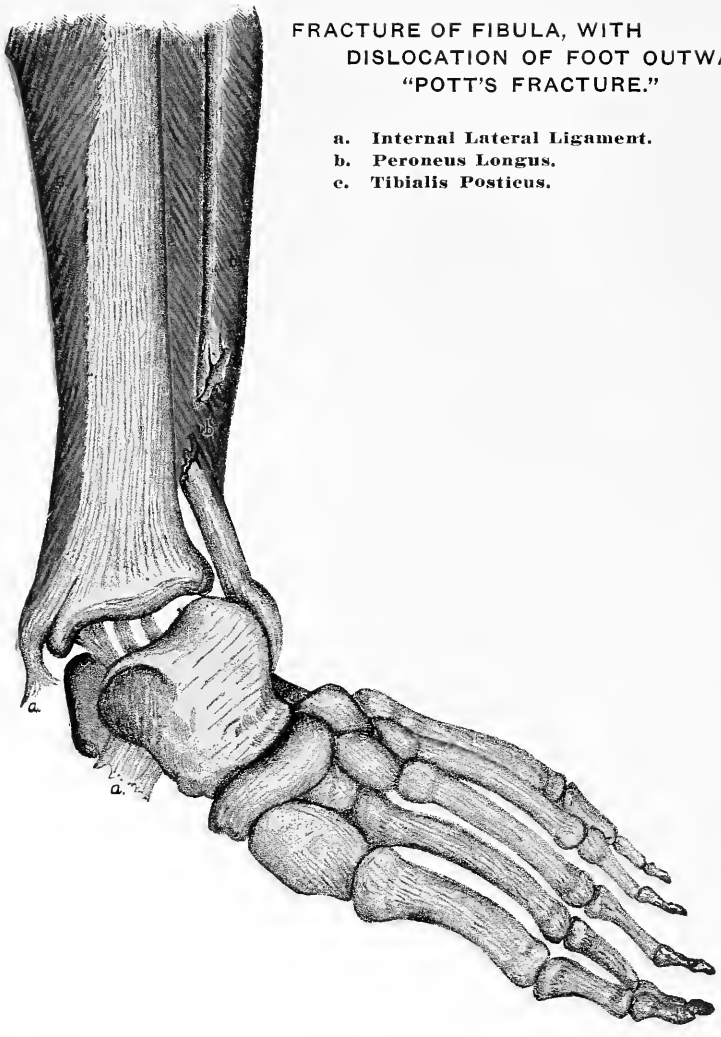

FRACTURE OF FIBULA, WITH
DISLOCATION OF FOOT OUTWARD.
"POTT'S FRACTURE."

a. Internal Lateral Ligament.
b. Peroneus Longus.
c. Tibialis Posticus.

Fracture of the Fibula—"Pott's Fracture"

This is one of the most frequent injuries to the ankle joint. The end of the Tibia is displaced from the corresponding surface of the Astragalus by the rupturing of the internal lateral ligament, permitting the projecting inward of the inner malleolus. The Fibula is usually broken from two to three inches above the ankle. The foot is everted by the action of the Peroneus Longus, its inner border rests upon the ground while at the same time the heel is drawn upward by the muscles of the calf. Reduction is effected by flexing the leg at right angles with the thigh, and by the application of extension and counter extension from ankle to knee. Fixation and adaptation is best maintained by a plaster cast, and maintaining the foot in a position of forced inversion.

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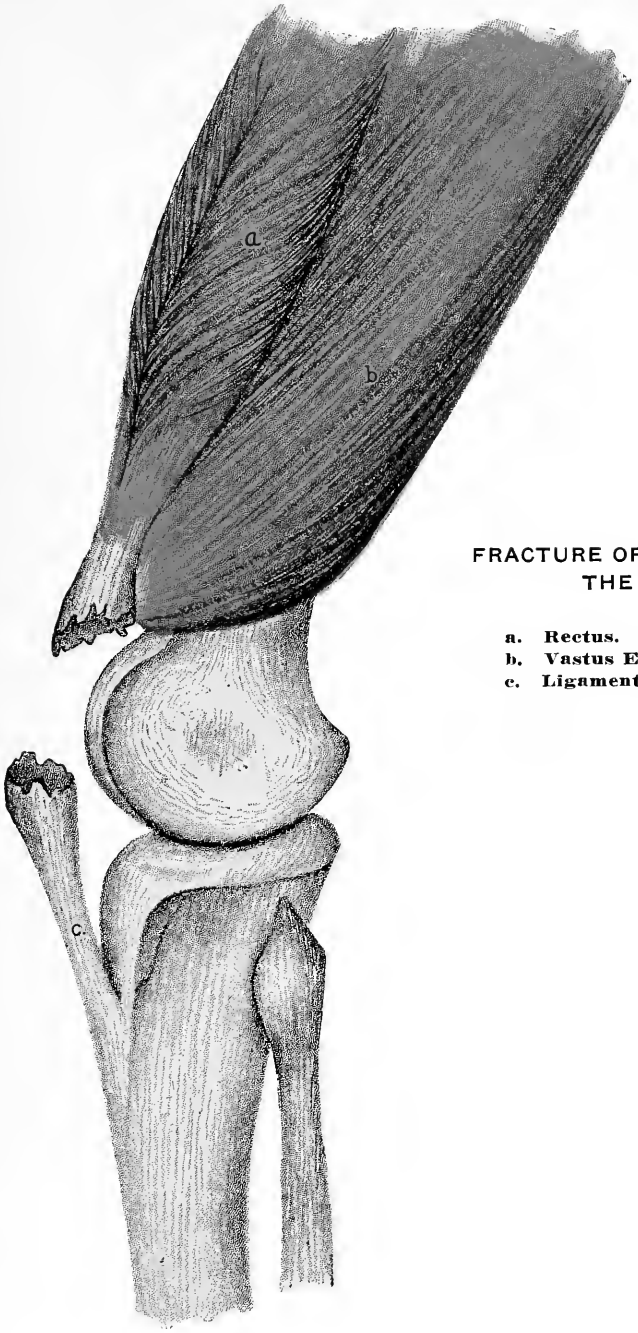

FRACTURE OF
THE PATELLA.

a. Rectus.
b. Vastus Externus.
c. Ligamentum Patellæ.

Fracture of the Patella

The fragments in this fracture are separated by the effusion which takes place into the joint, and by the action of the Rectus and Vasti muscles. The degree of separation may be as much as three inches. The only treatment worthy of mention, of the many that are devised, is the operative, in which the Patella is cut down upon, the fragments approximated and wired in position and the limb immobilized by a plaster dressing for several months.

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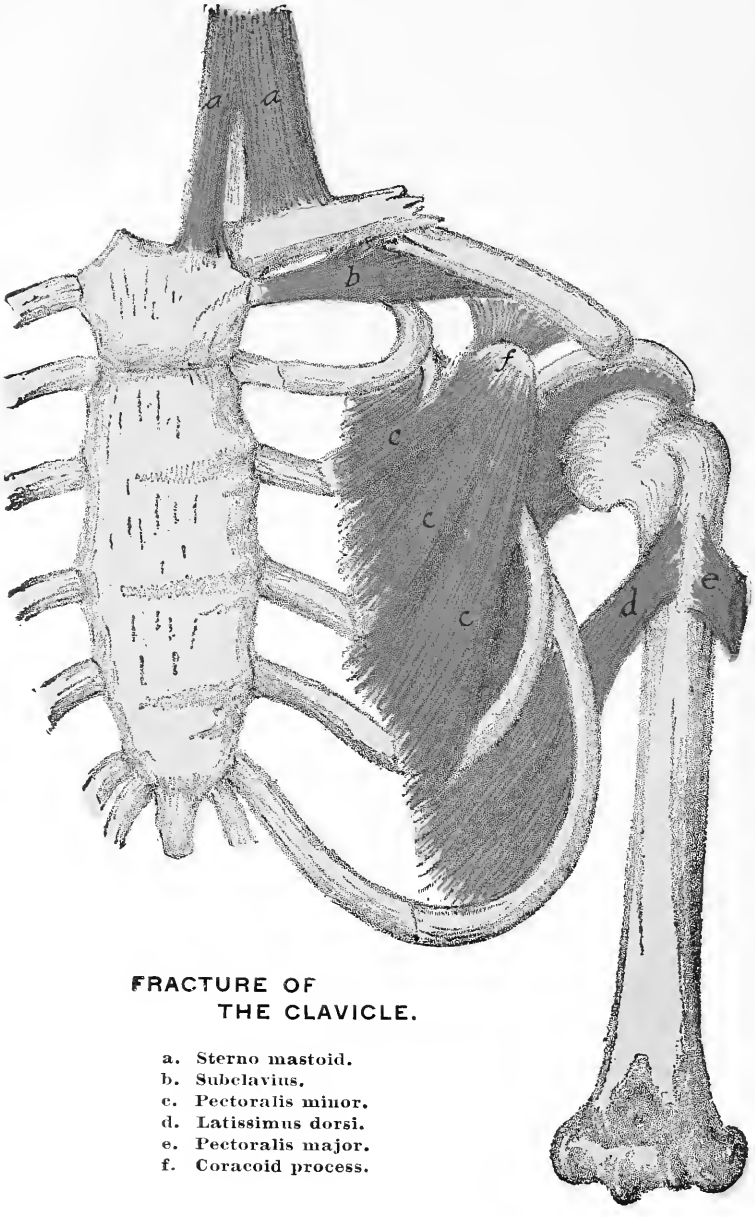

FRACTURE OF
THE CLAVICLE.

a. Sterno mastoid.
b. Subclavius.
c. Pectoralis minor.
d. Latissimus dorsi.
e. Pectoralis major.
f. Coracoid process.

Fracture of the Middle Third of the Clavicle

In this fracture, when complete, the shoulder falls downward, forward and inward. The inner fragment is seldom displaced, being held in position by the Costoclavicular ligament and the antagonism between the Sterno-mastoid and Pectoralis major muscles. It is, however, sometimes elevated by the inner extremity of the outer fragment getting beneath it, or by the action of an extra strong Sterno-mastoid. The inner end of the outer fragment is drawn inward, beneath or behind the inner fragment, by the action of the Subclavius, the Pectoralis major and minor, and the Latissimus Dorsi muscles, while the outer end is forced forward and downward by the action of the Pectoral muscles and the weight of the shoulder.

The indication for treatment is to carry the shoulder upward, backward and outward, bringing the fragments in line, and fix it in that position. This may be done by applying Sayre's adhesive plaster dressing, Velpeau's bandage of Moore's method—descriptions of which may be found in recent textbooks on surgery.

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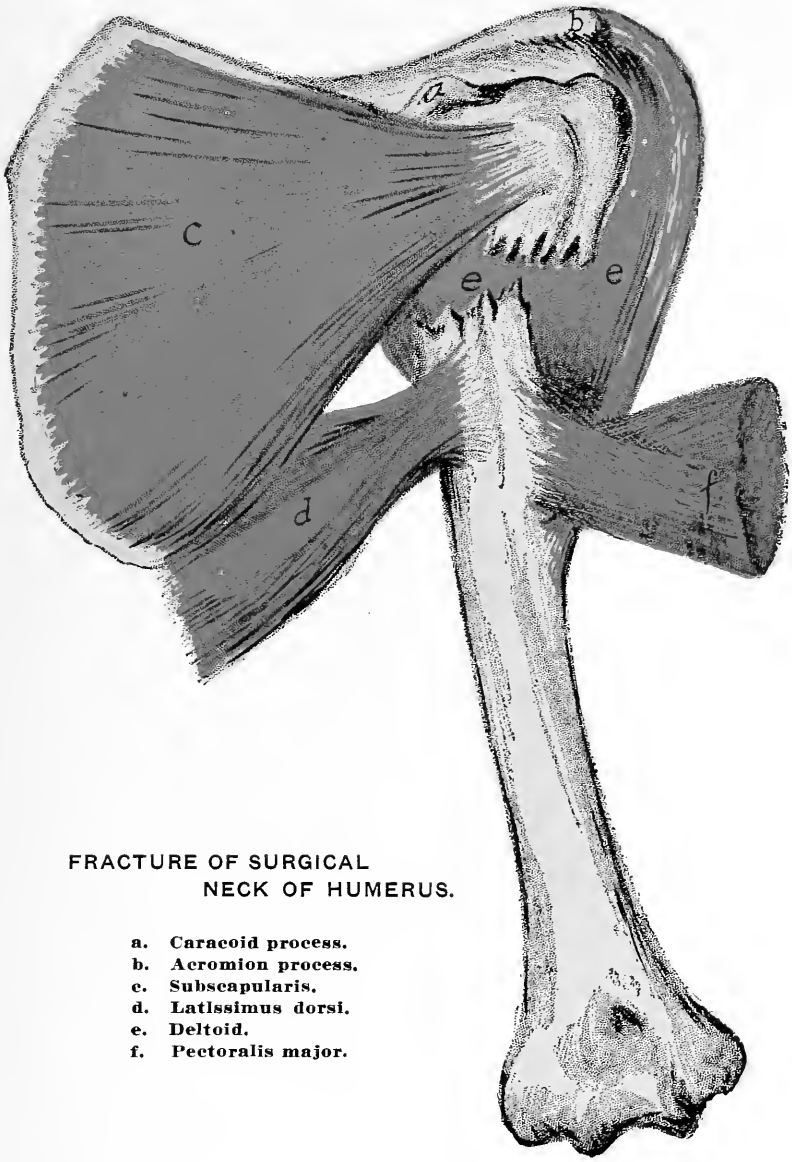

FRACTURE OF SURGICAL NECK OF HUMERUS.

a. Caracoid process.
b. Acromion process.
c. Subscapularis.
d. Latissimus dorsi.
e. Deltoid.
f. Pectoralis major.

Fracture of the Surgical Neck of the Humerus

This is a common fracture, and its deformity resembles, somewhat, a dislocation of the head of the humerus into the axilla. The upper fragment is slightly elevated under the Coraco-acromial ligament by the muscles attached to the greater tuberosity; the upper end of the lower fragment is drawn inward, into the axillary space, by the action of the Pectoralis major, Latissimus dorsi and Teres major, the lower end is tilted outward by the Deltoid, while the whole fragment is drawn more or less upward by the Deltoid, Biceps, Coraco-brachialis, and long head of the Triceps.

The deformity is reduced by fixing the shoulder and drawing the arm outward and downward. The fragments are retained in position by applying a well-fitted shoulder-cap splint to the outer side of the arm, a well-padded straight splint to the inner side, pressed well into the axilla, the two being held by a roller carried over the shoulder in the form of a spica bandage. The fore-arm is flexed and secured to the side.

Another mode is, place a conical pad in the axilla, base upward, place the forearm in a sling, bring the elbow to the side and secure the same in this position with a plaster bandage carried around the chest.

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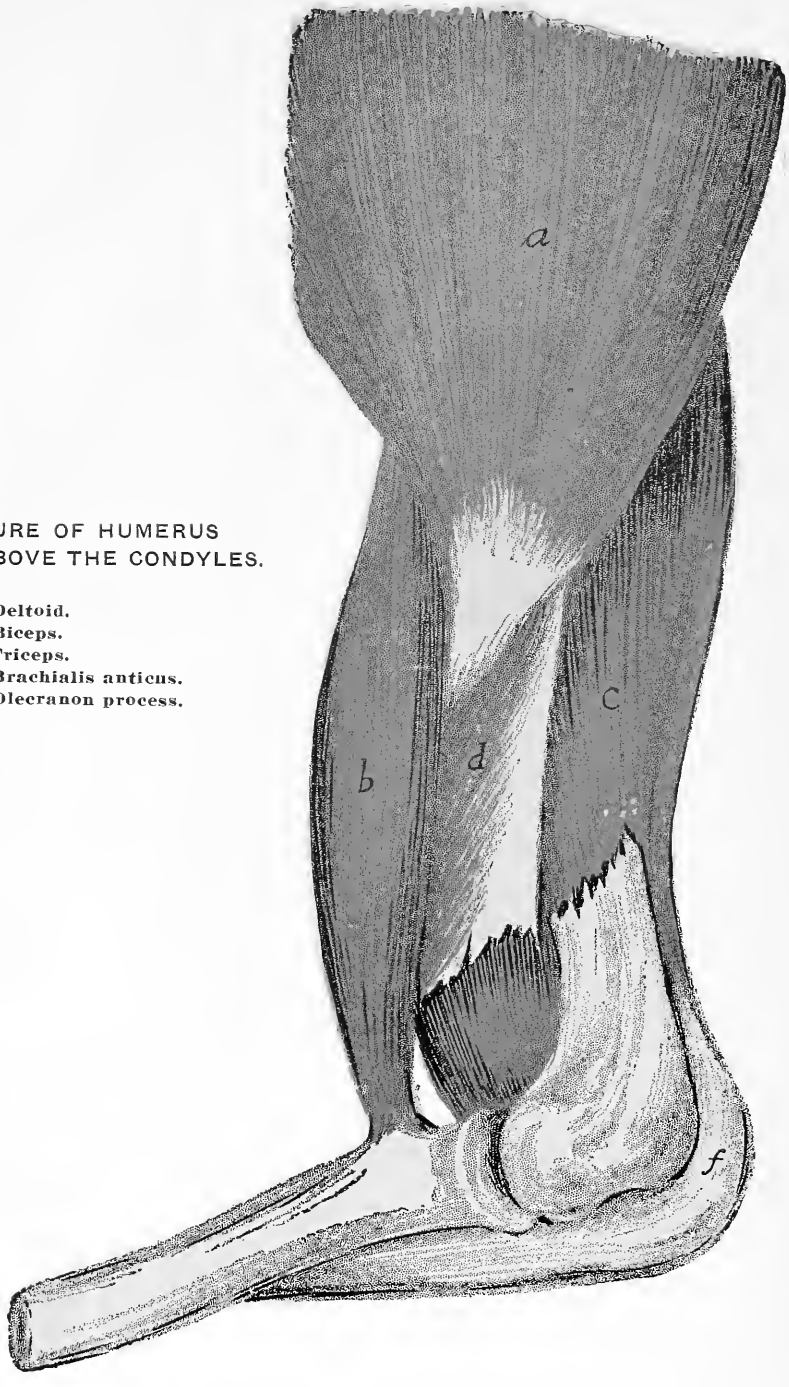
FRACTURE OF HUMERUS
ABOVE THE CONDYLES.

a. Deltoid.
b. Biceps.
c. Triceps.
d. Brachialis anticus.
f. Olecranon process.



Fracture of the Humerus Above the Condyles

The usual deformity in this fracture resembles a dislocation of the radius and ulna backward. If the fracture is oblique from above, downward and forward, the lower fragment is drawn upward and backward by the Brachialis anticus and Biceps in front, and the Triceps behind. This injury may be differentiated from dislocation by the increased mobility in fracture, the existence of crepitus, and the fact that the deformity when reduced by traction immediately reappears when the traction is removed.

The treatment consists in reducing the fracture and applying a well-padded, gutter-shaped, posterior rectangular splint, extending from the axilla to the wrist, with a well-adjusted bandage, or incasing the limb in a plaster of Paris dressing in the flexed position.

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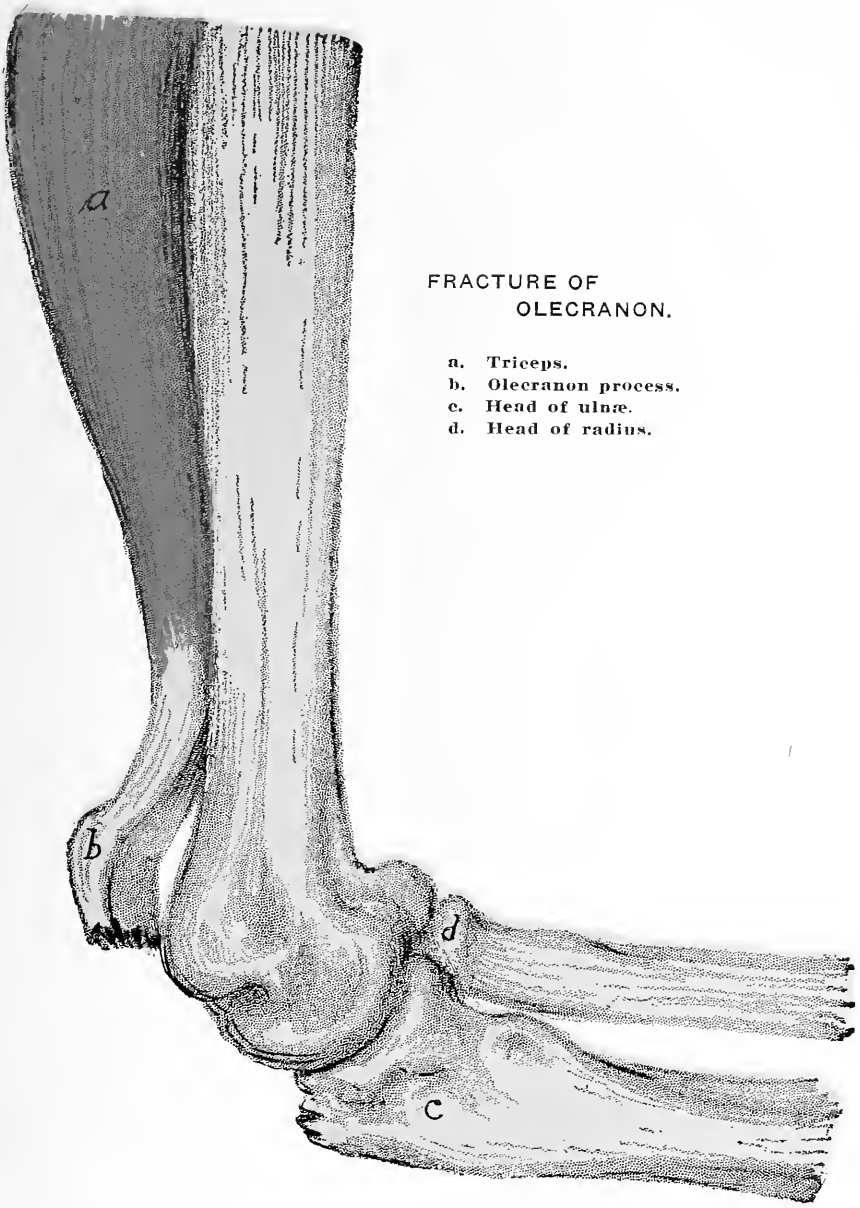

FRACTURE OF
OLECRANON.

a. Triceps.
b. Olecranon process.
c. Head of ulnæ.
d. Head of radius.

Fracture of the Olecranon Process

This fracture is attended by wide displacement. The detached fragment is drawn upward by the action of the Triceps muscle, from half an inch to two inches, the prominence of the elbow is consequently lost, and a deep hollow is felt at the back part of the joint, which is increased by flexion. At the same time the power of extending the forearm is more or less lost.

Treatment consists in relaxing the Triceps by extending the limb and retaining it in this position by means of a long anterior splint. The fragments are thus brought in close apposition and may be further approximated by drawing down the upper fragment by passing the bandage tightly above it and through notches made on each side of the splint directly over the flexure of the joint. A less favored treatment is to wire the fragments and apply a plaster of Paris dressing. The union is usually ligamentous.

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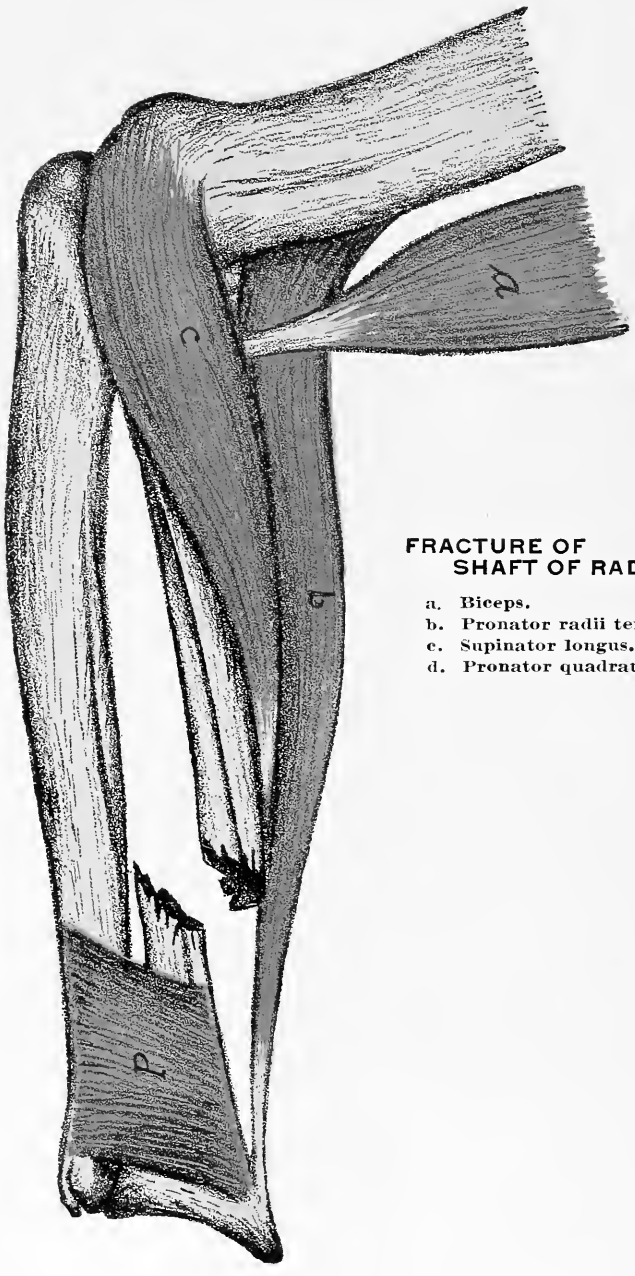

FRACTURE OF SHAFT OF RADIUS.

a. Biceps.
b. Pronator radii teres.
c. Supinator longus.
d. Pronator quadratus.

Fracture of Shaft of Radius Near the Center

In this variety of fracture the upper fragment is drawn forward by the biceps and rotated inward, over the ulna, by the pronator radii teres, to a position midway between pronation and supination. The lower fragment is drawn inward and slightly pronated by the pronator quadratus; at the same time the supinator longus, by elevating the styloid process, depresses the upper end of the lower fragment still more toward the ulna. This fracture is best reduced by flexing the forearm on the arm, placing the hand in a position midway between pronation and supination and making extension from the elbow; and should be retained in this position by well-padded lateral splints extending from elbow to wrist, or by the application of a light plaster cast to arm and forearm.

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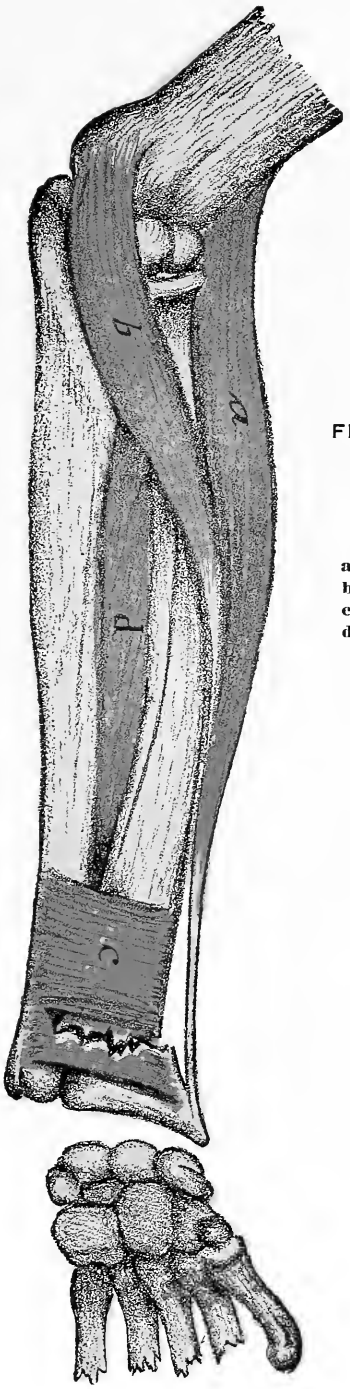

FRACTURE OF LOWER END OF RADIUS.

"Colles's Fracture."

a. Supinator longus.
b. Pronator radii teres.
c. Pronator quadratus.
d. Extensors.

Fracture of the Lower End of the Radius—"Colles's Fracture"

In this injury the lower fragment is drawn upward and backward behind the upper fragment by the combined action of the supinator longus and the flexors and extensors of the thumb and carpus, producing the characteristic "silver fish" deformity. The upper fragment projects forward, often lacerating the pronator quadratus (as in the picture) and is drawn by this muscle into close contact with the lower end of the ulna. Treatment consists in flexing the forearm and making powerful extension at wrist and elbow, depressing at the same time the radial side of the hand, and maintaining the hand in that position by well-padded pistol-shaped splints.

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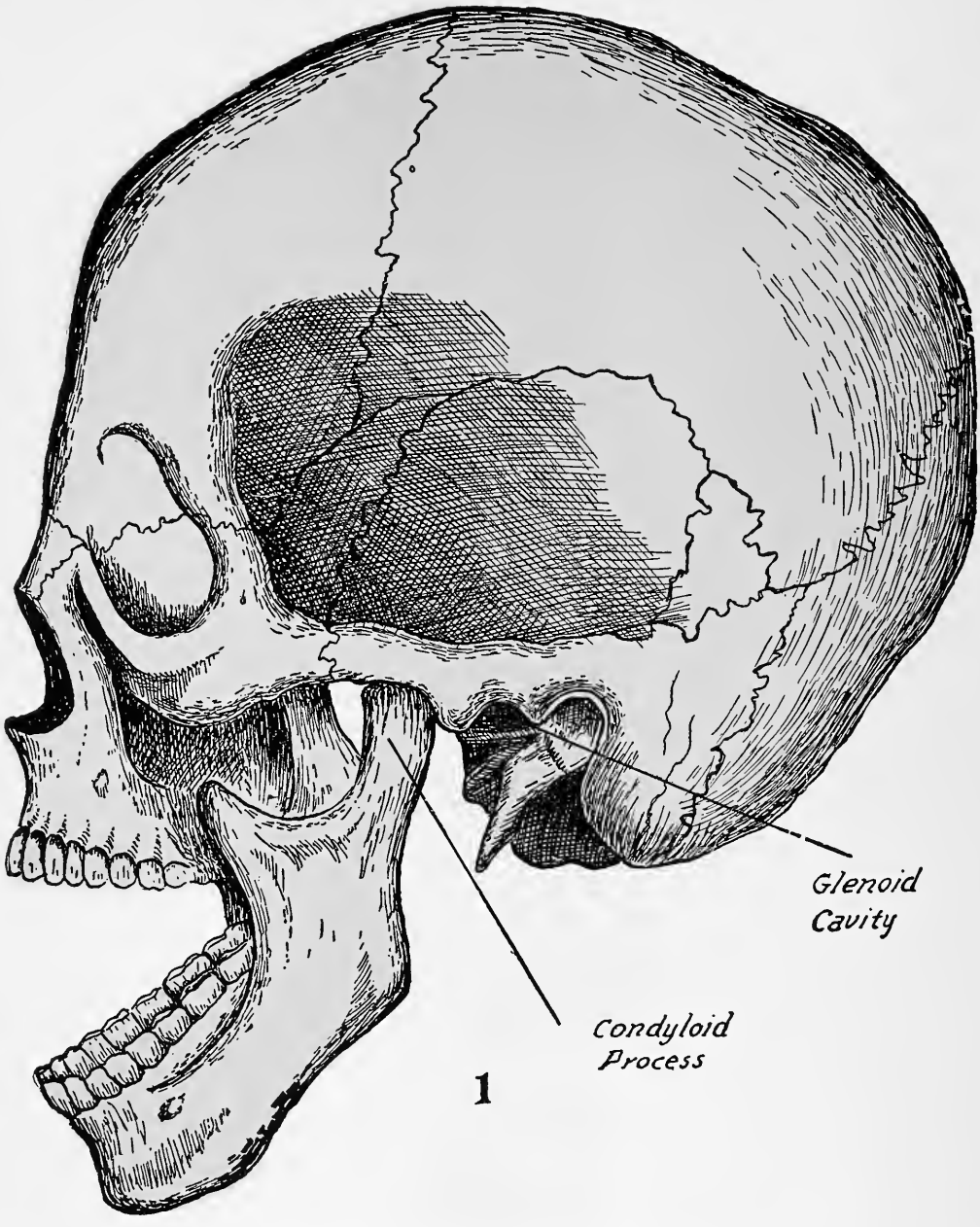

Dislocation of the Jaw

In this accident the articular surface of one, or of both, of the condyloid processes of the inferior maxilla rests upon the base of the zygomatic process, being drawn forward out of the glenoid cavity.

TREATMENT

The thumbs, well wrapped to protect them from injury, are placed between the posterior molar teeth on each side of the jaw, the jaw is grasped firmly at the base of the bone; then with the patient's head well supported, strong pressure is made downward upon the molar teeth, while with the fingers the chin is forced upward, the condyloid processes are released from their false position and are drawn back into the glenoid cavity by action of the muscles. The jaw should be retained in place for two or three weeks, nourishment being administered through a tube passed behind the molars.

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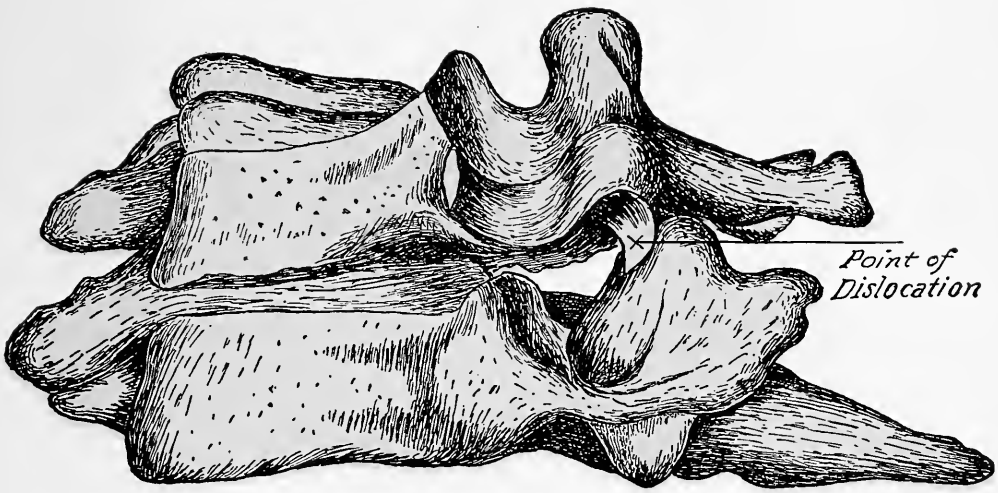

Unilateral Dislocation of Cervical Vertebra

The articular surface on one side of the upper vertebra is carried upward and forward until its posterior edge has passed the anterior edge of the one with which it articulates.

TREATMENT

Treatment consists of simple traction upon the head, counter extension being made by the weight of the body, followed by rotation of the face toward the dislocated side. Or better still, abduct the head still further to free the articular processes, then rotate backward into place. Traction when used should be in the direction of the long axis of the upper segment. A plaster of Paris dressing is all that is needed in the way of retentive apparatus.

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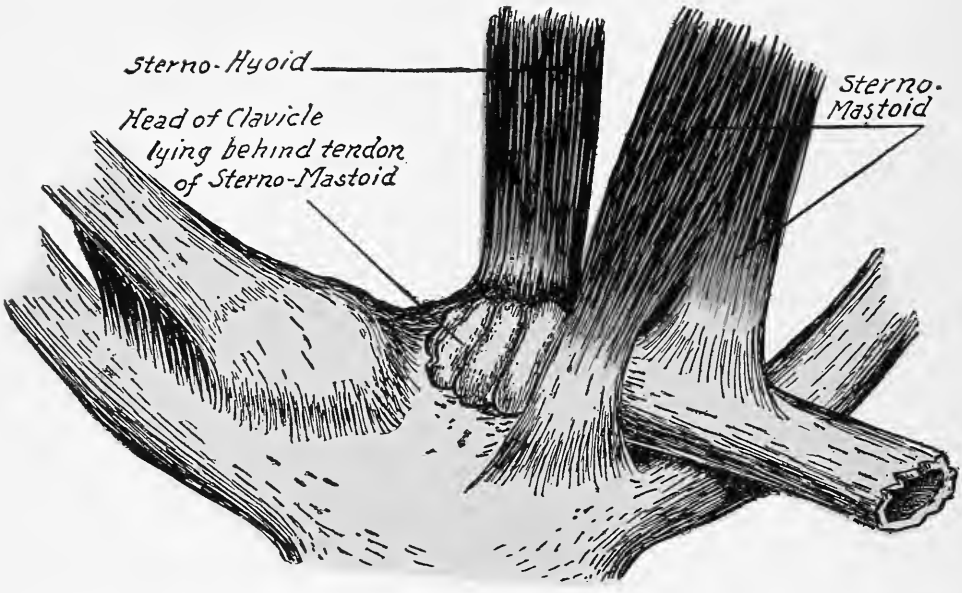

Upward Dislocation of Sternal End of Clavicle

The end of the clavicle rests on the upper border of the sternum in contact with the sterno-hyoids and sterno-mastoid, and may pass behind the sternal portion of the sterno-mastoid. The anterior and posterior sterno-clavicular ligaments are torn and the meniscus accompanies the clavicle; there is frequently dyspnea and dysphagia.

TREATMENT

Reduction is made by drawing the shoulder outward, and making pressure downward and outward upon the sternal end of the clavicle. Fixation of the shoulder by various dressings and the recumbent position constitutes the treatment. Recurrence frequent.

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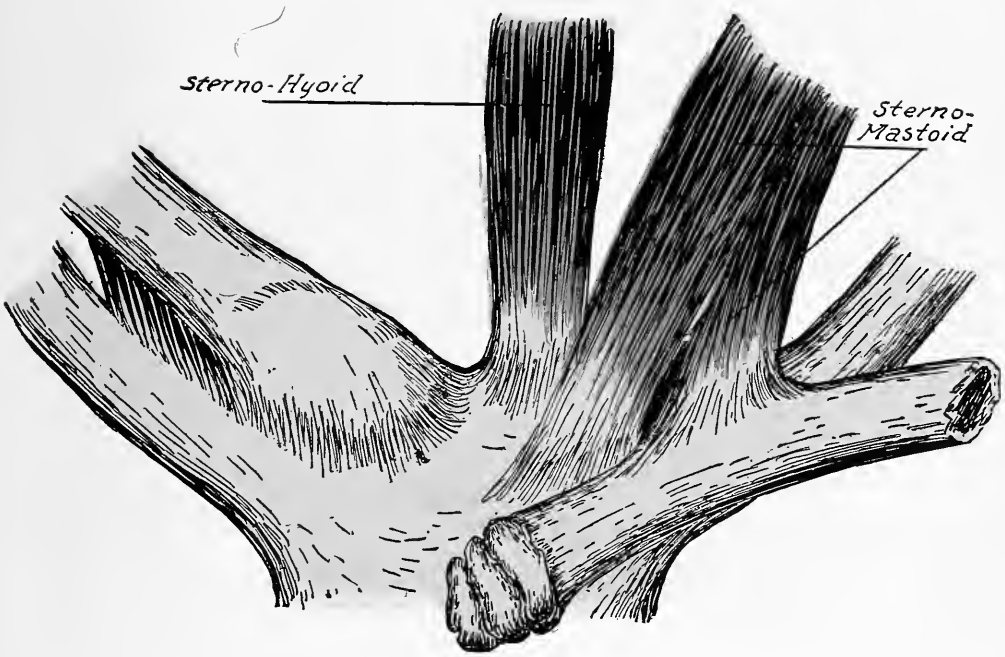

Dislocation of Sternal End of Clavicle Downward and Forward

The articular surfaces are completely separated, and the posterior articular surface of the clavicle rests upon the front of the sternum near the median line, sometimes as much as three inches below the normal position. Both anterior and posterior ligaments are torn.

TREATMENT

Reduction is effected by drawing the shoulder outward and backward, and making pressure upward and backward upon the dislocated end. Failures to reduce are sometimes encountered, but the greatest difficulty is to retain after reduction. Stimson recommends a figure-of-eight bandage about both shoulders, the turns crossing in front of the chest; and also a plaster of Paris dressing.

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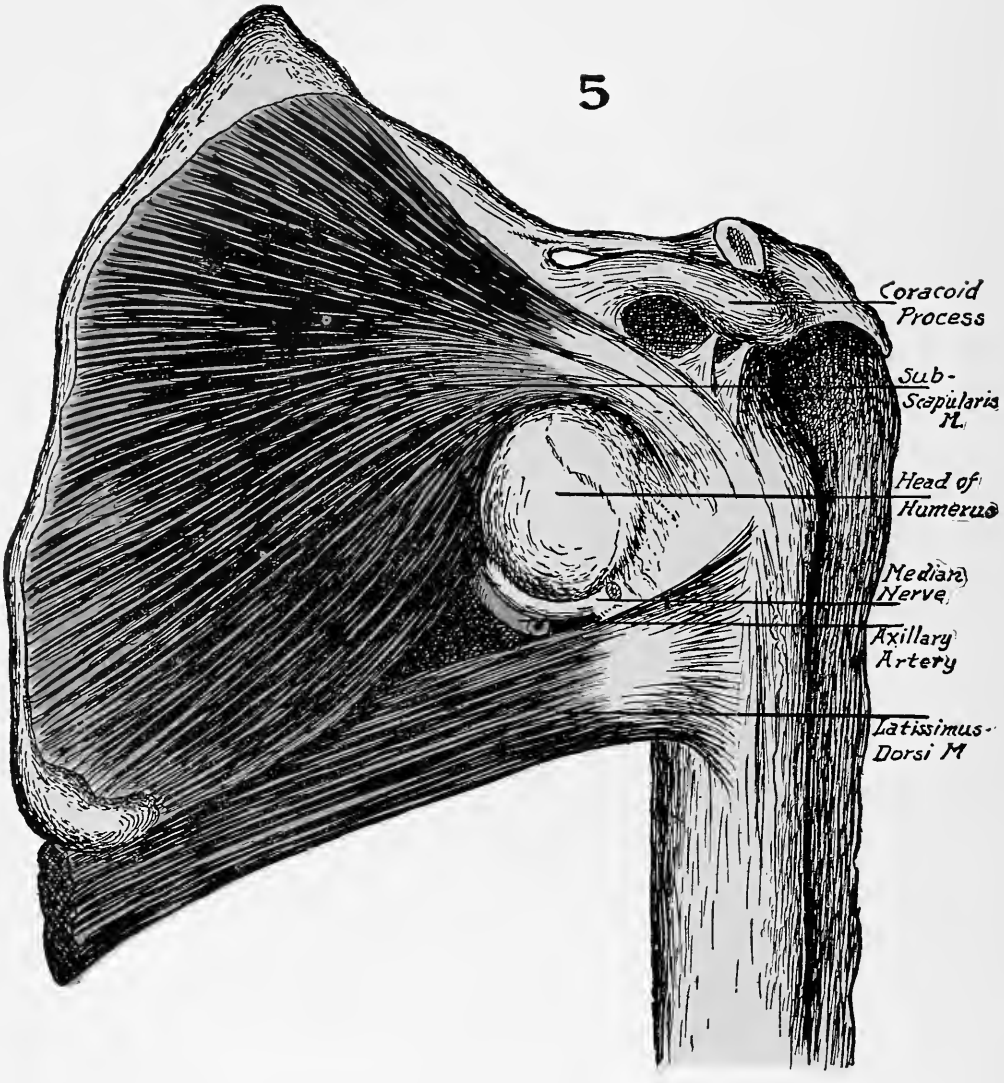

Subcoracoid Dislocation of the Humerus

In this injury the capsule is torn at its inner and lower portion and extends along the inner and lower border of the glenoid fossa. The subscapularis is frequently torn more or less widely, the upper portion lying on the head of the humerus; the other shoulder muscles are frequently more or less lacerated. The head of the humerus lies against the edge of the glenoid fossa or back against the neck of the scapula, and either close up against the beak of the coracoid or lower down according to the amount of untorn capsule and the tension.

TREATMENT

Kocher's method of reduction is the best of several and is least apt to hurt the axillary vessels. This consists of three movements or manipulations. External rotation of the forearm, the elbow being held close to the side; carry the elbow forward and raise it in the sagittal plane, the forearm still being held in external rotation; internal rotation of the forearm. This method failing, attempt traction downward and outward, the elbow not being raised higher than the shoulder, combined with direct pressure on the head. Failing this, etherize and repeat the attempts. Occasionally the joint has to be opened in order to effect reduction.

After reduction joint should be kept at rest for three weeks.

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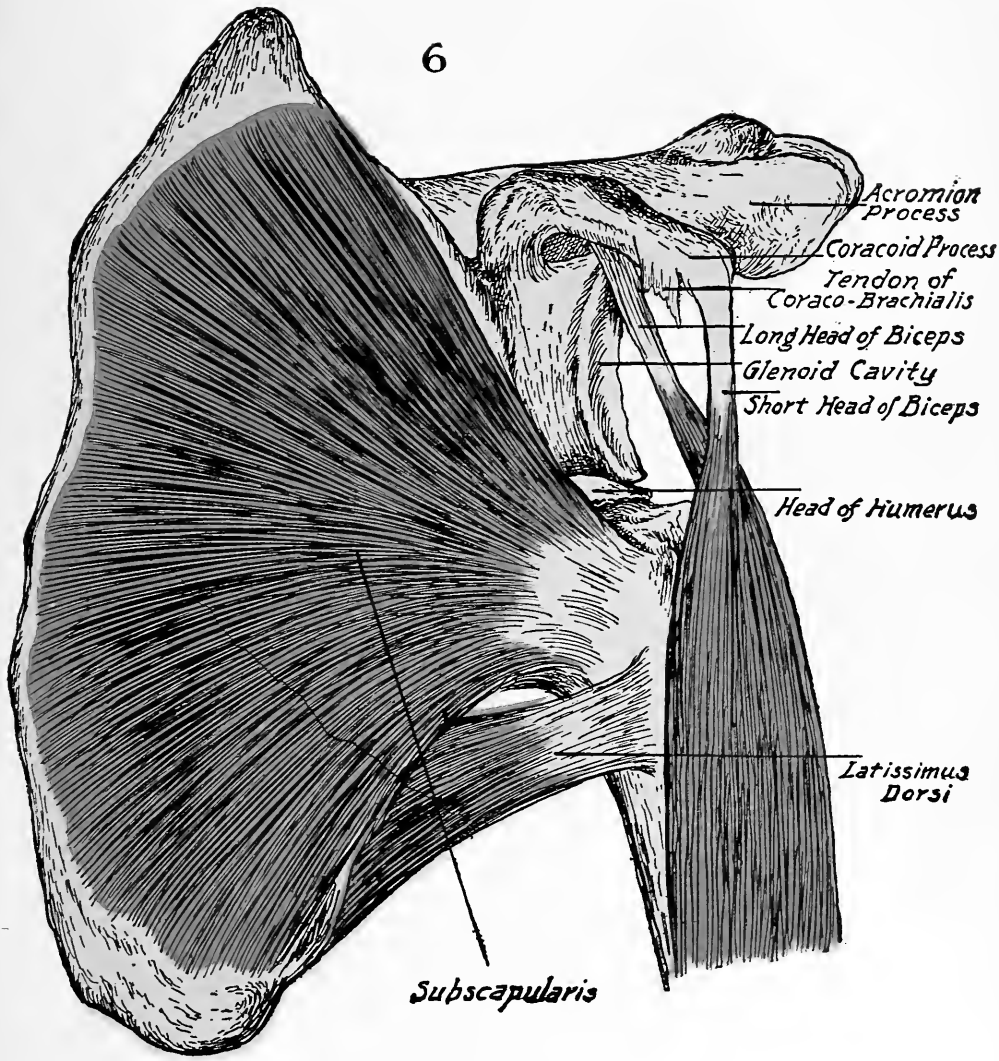

Subglenoid Dislocation of the Humerus

The tear in the capsule is generally smaller than that in the sub-coracoid variety, and differs from it in not extending so far upward. The head of the humerus varies somewhat in its position but generally lies below and in front of the glenoid fossa and beneath the untorn subscapularis.

TREATMENT

The best treatment is traction on the arm as found, with the fist in the axilla to press the head of humerus outward, followed by necessary upward pressure at the elbow. Care must be taken not to overstretch the structures, or much damage may result to the axillary vessels. Fixation for three or four weeks constitutes the remainder of the treatment.

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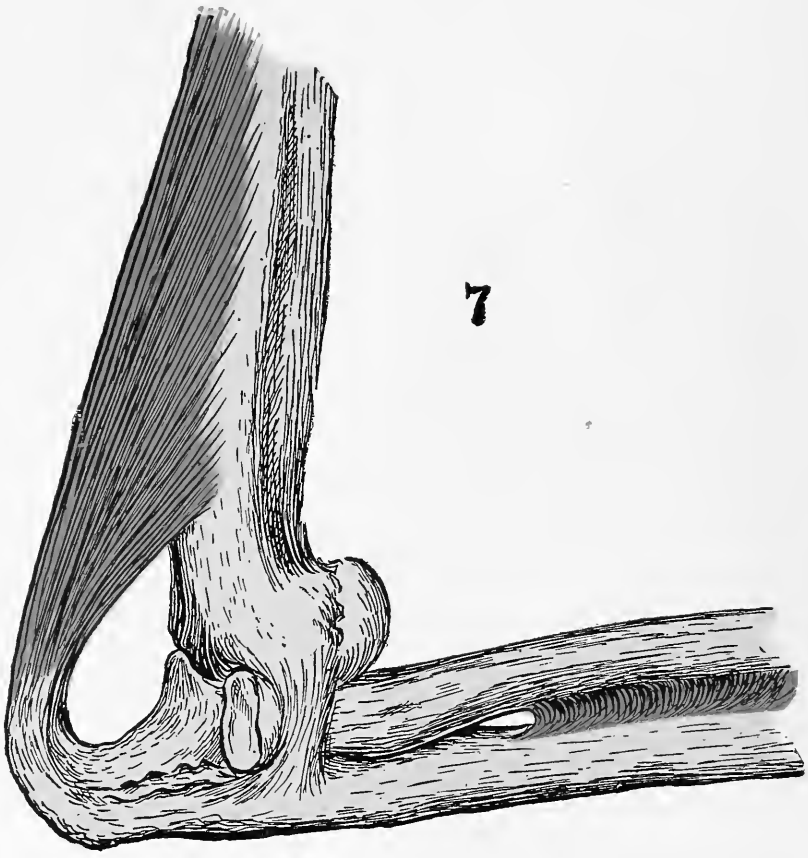

Dislocation of Elbow Backward

The internal lateral ligament is always torn and the rent extends along the anterior ligament. The external lateral ligament is usually torn or entirely detached from the humerus. The tip of the internal epicondyle is frequently torn off and displaced upward and backward. The flexor muscles of the hand are sometimes freely torn from the humerus, the brachialis anticus may be lacerated or torn clear across. The capsule at the back of the external condyle is torn off, and by retaining its continuity with the periosteum frequently strips it up and folds it over the head of the radius. The displacement varies greatly. The top of the coronoid process may rest against the lower and posterior surface of the trochlea while the radius remains in place, or both bones may be dislocated, the radius following the ulna in the backward excursion.

TREATMENT

Place the knee on the inner side of the elbow joint, in the bend of the arm, and take hold of the patient's wrist, meanwhile bending the arm. Press on the radius and ulna with the knee so as to separate them from the humerus, thus allowing the coronoid process to slip from the posterior fossa of the humerus; while this pressure is supported by the knee, the arm is to be forcibly but slowly bent and the reduction is soon effected. It may also be accomplished by forcibly bending the arm around some convenient post. Should the olecranon be fractured, special treatment looking to the correction of that complication is, of course, to be adopted.

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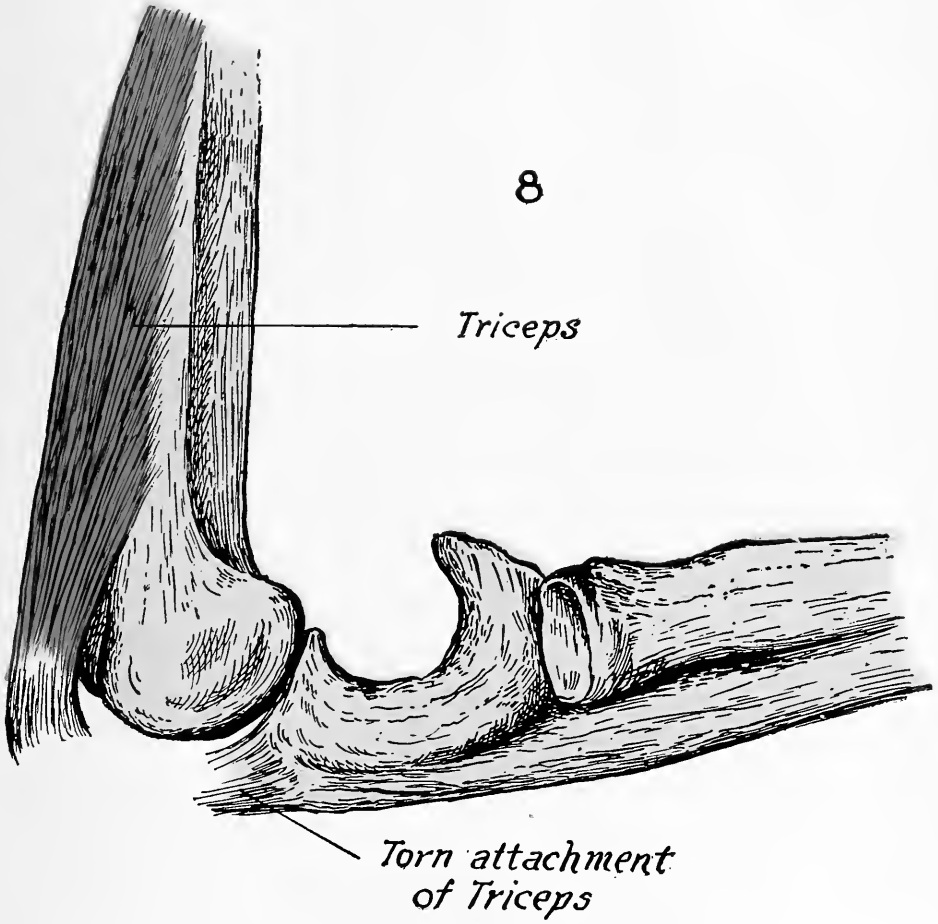

Forward Dislocation of the Elbow

In the complete form of this injury the upper surface of the olecranon rests against the front of the capitellum, the annular and interosseous ligaments remain whole, while the anterior and posterior and both lateral ligaments are almost invariably ruptured. The triceps is completely torn from its attachment to the olecranon, while the two radial extensor muscles and all the muscles arising from the epicondyle are generally detached. The ulnar nerve is often torn behind the condyle.

TREATMENT

Reduction is usually best effected by flexing the arm to a right angle, and pulling the upper ends of the bones back into place by means of a strap passed around the front of the forearm close to the elbow.

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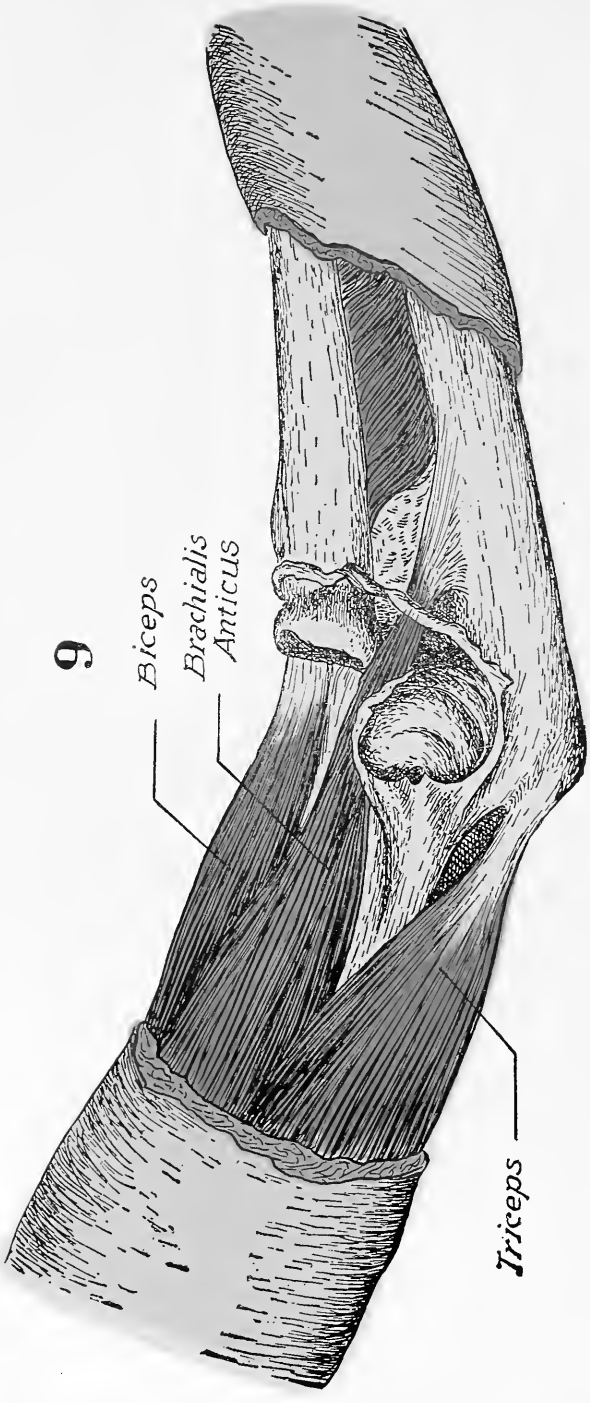

Forward Dislocation of Head of Radius

The head of the radius rests in partial flexion, upon the anterior surface of the external condyle above and to the inner side of its normal position. The capsule is torn in front close to its attachment to the humerus, the ligament remains untorn and encircles the neck of the radius, while the head projects through the rent in the capsule.

TREATMENT

Reduction is effected by traction upon the radius at the wrist, the forearm being supinated and extended, combined with pressure upon the head of the radius. Fixation in the flexed position for two or three weeks constitutes the after-treatment, followed by passive motion.

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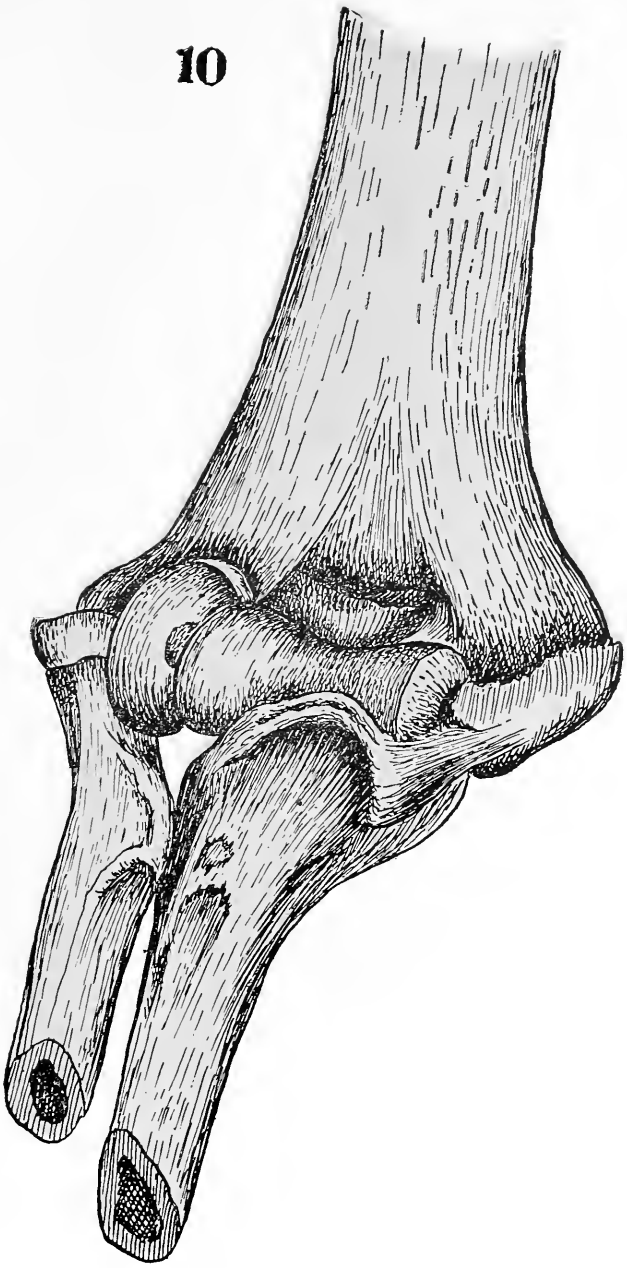

Dislocation of Head of Radius Outward

(Trochlea is much broadened.)

The external lateral ligament is generally torn, but there are no special characteristic symptoms. The limb is generally partly flexed and pronated, the movement of the joint restricted, and the head of the radius can be felt out of its customary place. The injury is a rare one.

TREATMENT

Reduction is effected by adduction of the forearm and direct pressure on the head of the radius; it is usually easy.

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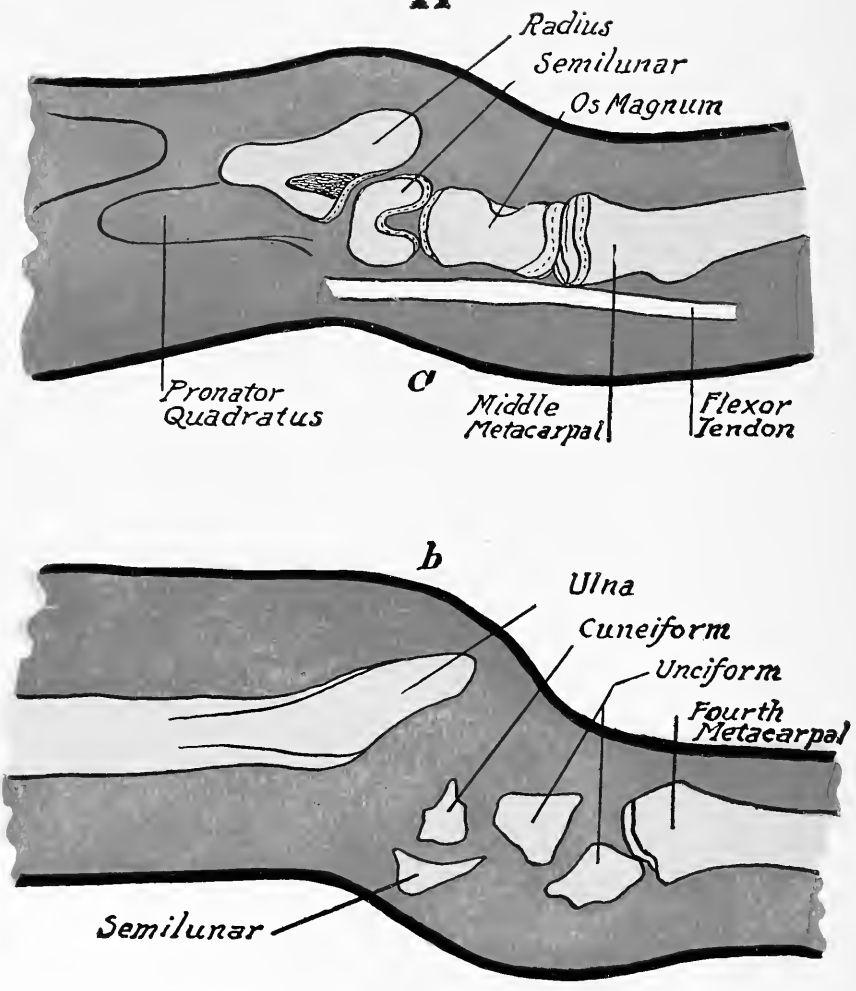

Forward Dislocation of the Carpus

Longitudinal Section through.

a. Radius, Os Magnum and Semilunar.
b. Ulna, Unciform and Cuneiform.

This peculiar and rare affection is of a spontaneous nature and, as the limb generally acquires its full usefulness as soon as the skeleton attains its growth, the objection to operative interference is obvious.

TREATMENT

Reduction is impossible, as there is so much alteration in the shape of the bones. Madelung, after prolonged attempts to improve the position with dressings, etc., did no good beyond relieving pain. Finally, he limited his efforts to improving the strength of the arm in all its parts, and the wearing of an adjustable leather bracelet moulded to the forearm, thus preventing movement of the wrist and leaving the fingers free.

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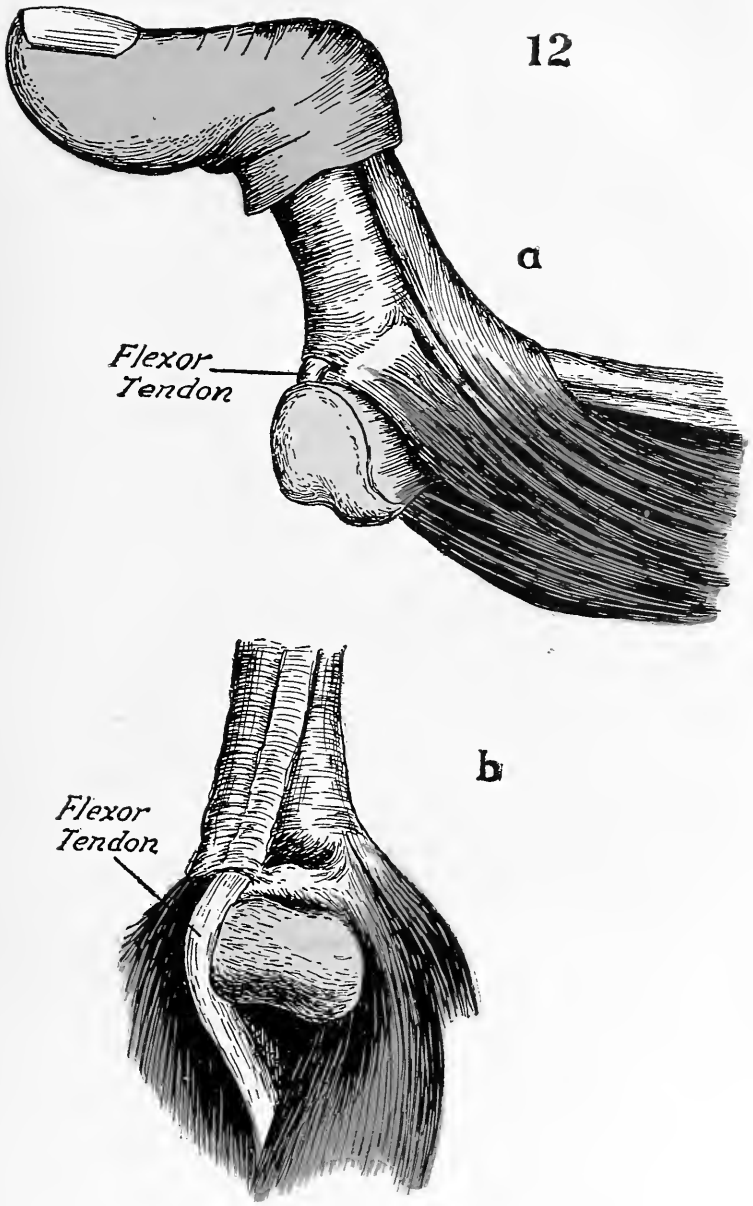

Dislocation of the Thumb

a. Lateral View.
b. End View of Right Thumb.
Long Flexor Tendon is displaced to inner side.

The head of the phalanx leaves the articular surface of the metacarpal bone and rests upon the dorsal surface. The external lateral ligament is torn and, usually, the internal one. The flexor tendon may remain in position tightly stretched, or, as is more commonly the case, it slips to the inner side of the metacarpal bone. The head of the metacarpal projects through the rent in the capsule.

TREATMENT

Reduction is made by pressing the metacarpal bone toward the hand and, while maintaining the phalanx in rectangular dorsal flexion, pressing its base downward toward the end of the metacarpal bone and flexing when the proper level is reached. Retention for a couple of weeks constitutes the remainder of treatment.

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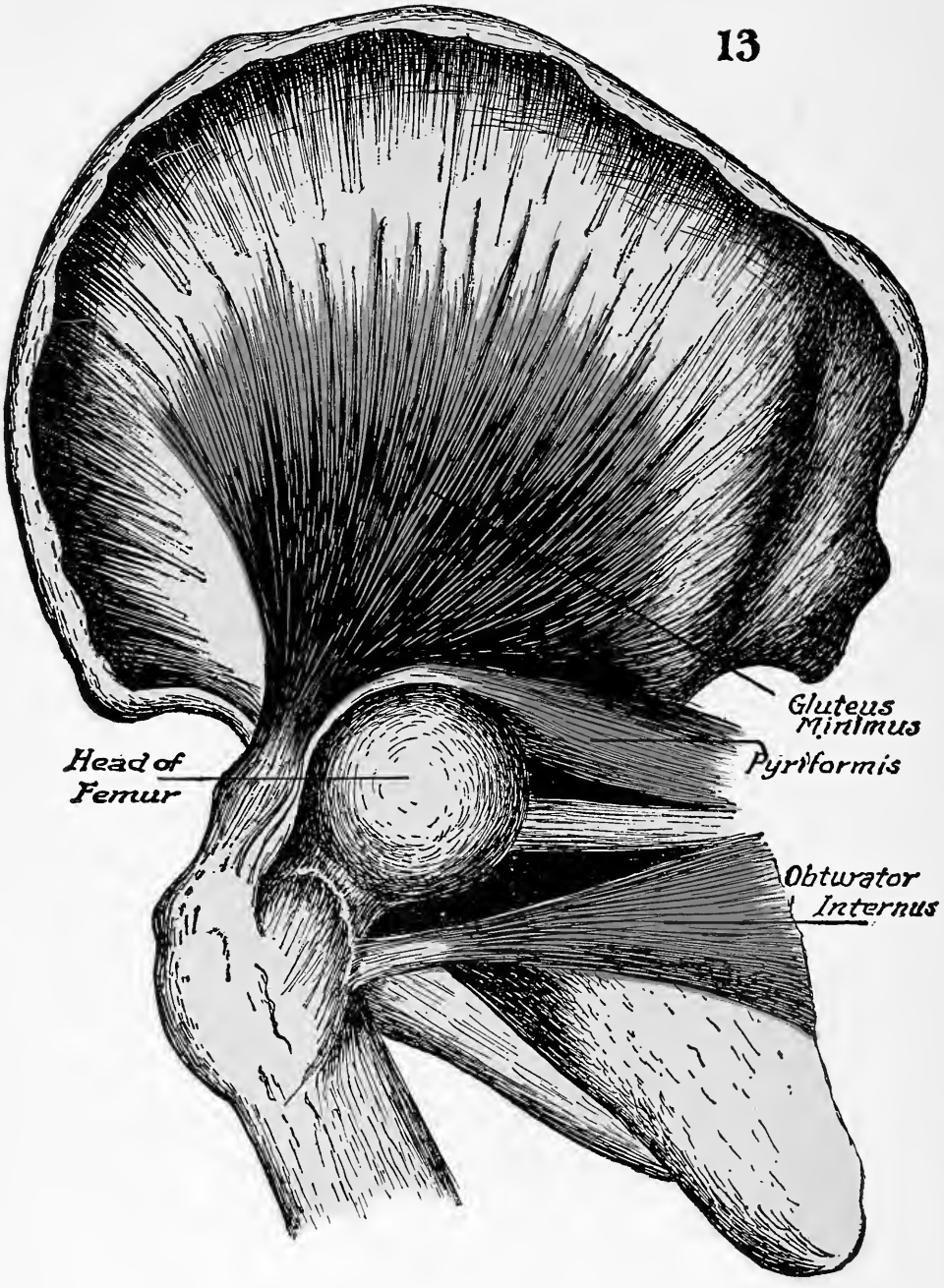

Dorsal Dislocation of Femur

Head of Femur Lies Behind Acetabulum.

The capsule in the lower posterior part is torn, and may be torn from the femur and rarely from the acetabulum. The anterior portion of the capsule and the ilio-femoral ligament usually remains untorn. The ligamentum teres is usually torn from its attachment to the femur. The quardratus femoris is usually completely torn across; the gemelli, pyriformis and obturator externus are generally torn, while the gluteus and obturator internus escape. The head of the femur as a rule rests close to the margin of the acetabulum or may overlap it, and may be displaced a variable distance backward and upward.

TREATMENT

Reduction consists of four consecutive movements: First, forward rotation; second, flexion to a right angle; third, traction; fourth, outward rotation.

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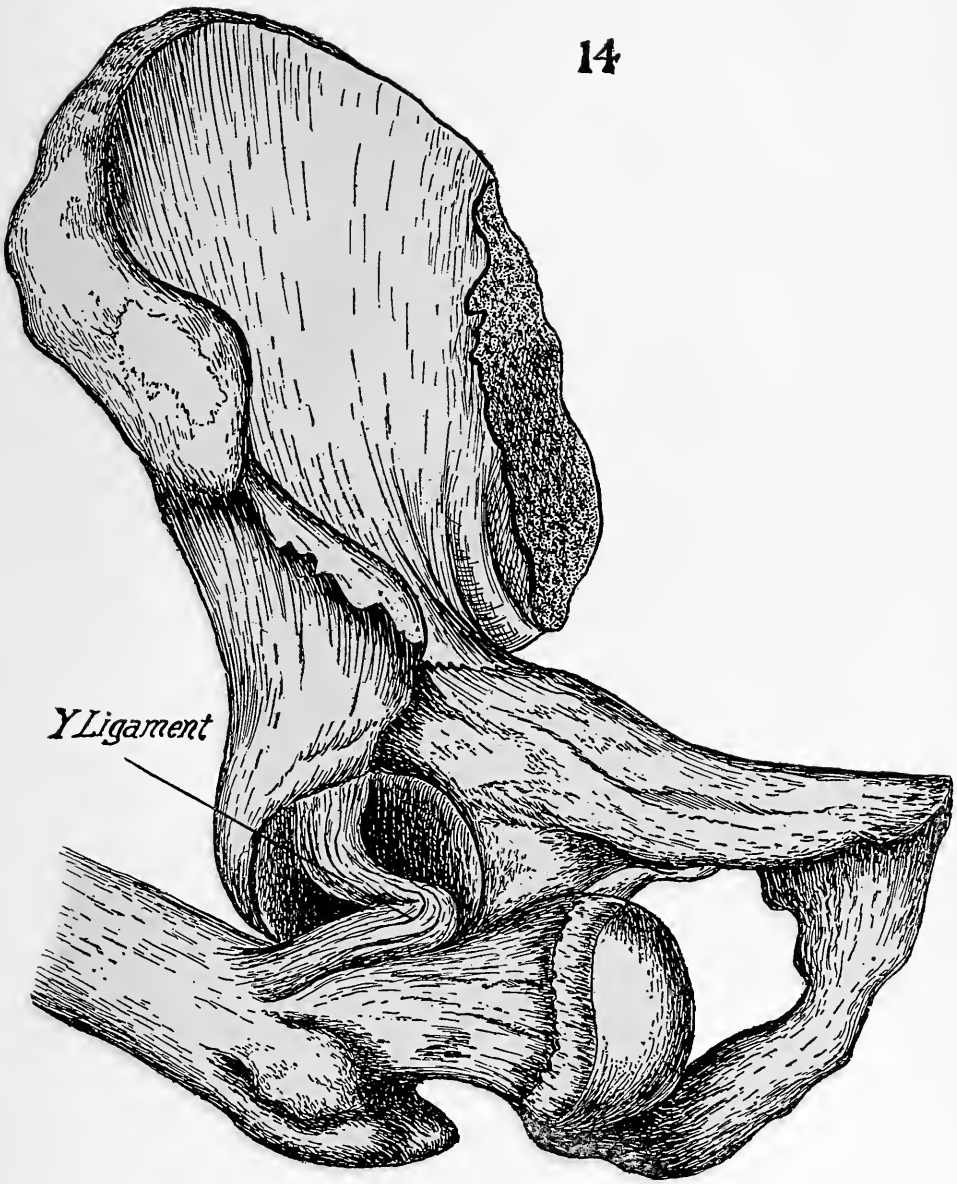

Obturator Dislocation of Femur

(Showing effect of Flexion on Y Ligament.)

The capsule is ruptured on the inner and lower side, usually near the acetabulum and sometimes extending along the neck, together with laceration of the obturator externus and pectineus. The head of the femur rests on the obturator foramen or on the ramus beyond it.

TREATMENT

Reduction is generally easy by anesthetizing the patient and then first increasing the flexion and rotation, making traction in the long axis of the limb, and finally lowering and rotating inward.

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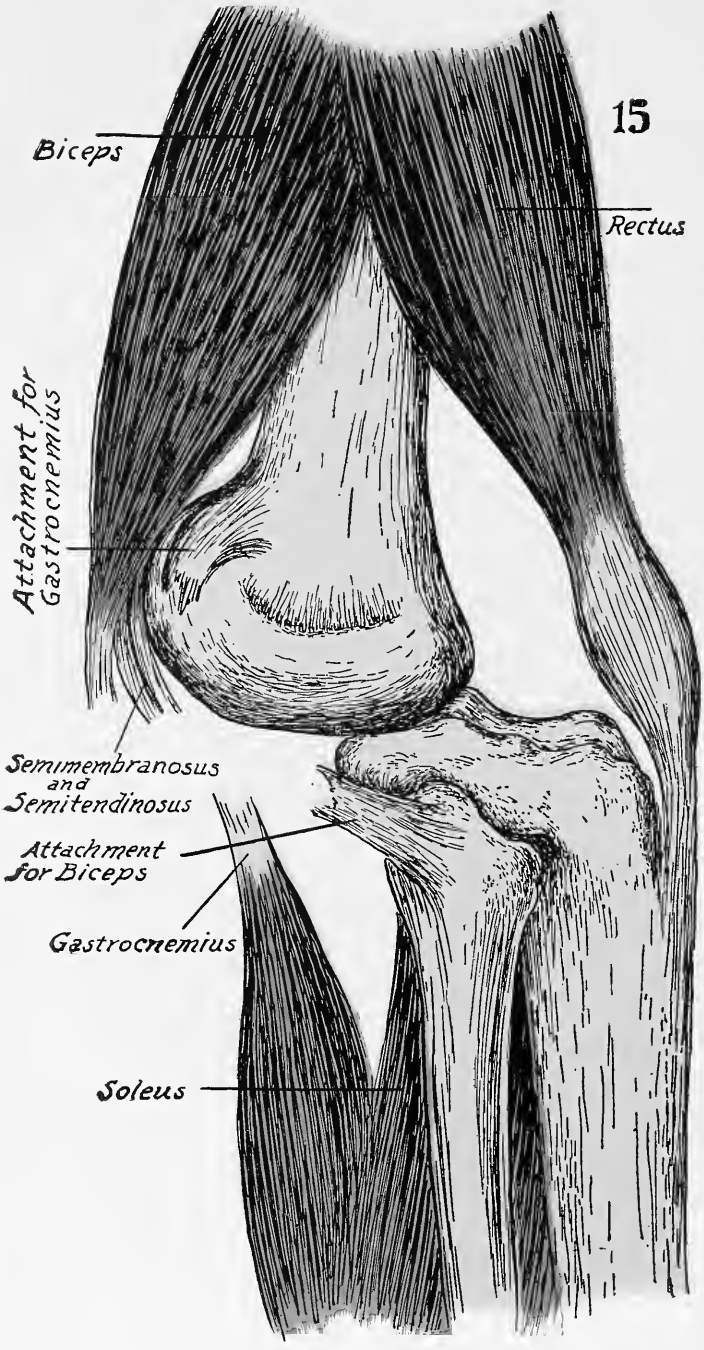

Forward Dislocation of the Knee

In the complete dislocation the injuries are very extensive, one or both lateral ligaments, one or both crucial, the posterior and the lateral ligaments of the patella are completely ruptured or torn across. The posterior muscles, the biceps, gastrocnemius, popliteus and even the soleus and vastus internus are lacerated or divided; the internal and external popliteal nerves may be torn or bruised, the popliteal artery and vein ruptured, and the skin of the popliteal space torn through. The overriding of the femur and tibia may be as much as four inches.

TREATMENT

Reduction is easy by direct traction and reposition of articular surfaces. If serious injury to the popliteal vessels exists amputation will be necessary.

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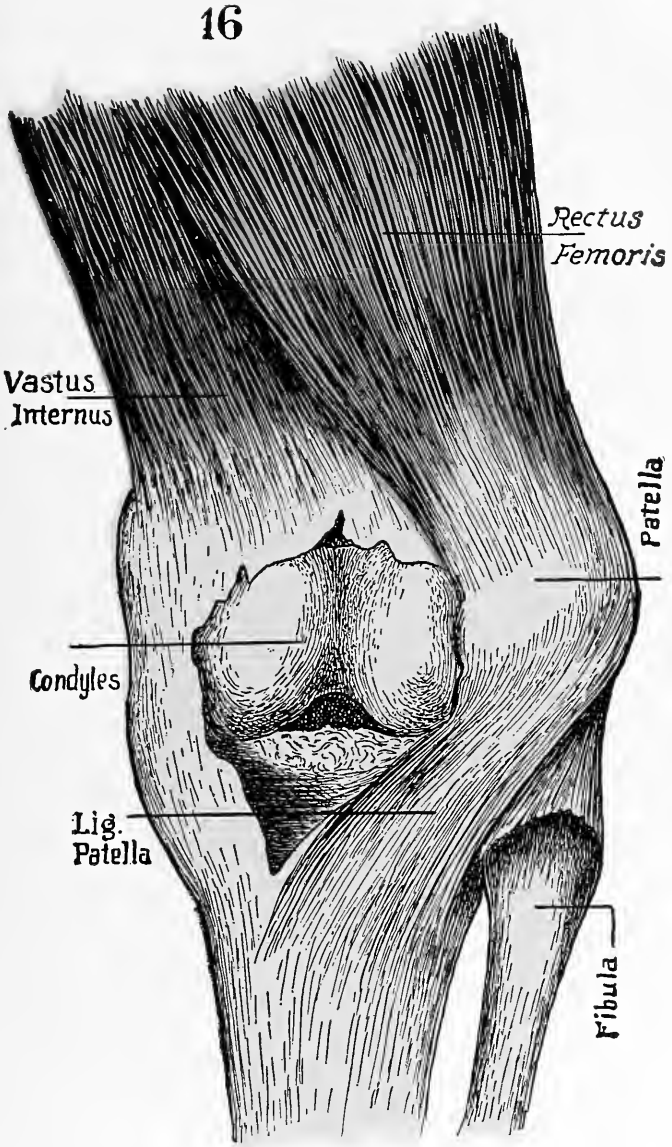

Dislocation of the Patella Outward

The patella is displaced entirely to the outer side of the external condyle, against which it rests either by its posterior surface, or by its inner border.

TREATMENT

Full extension of the knee and flexion at the hip, followed by direct pressure on the patella with the hands.

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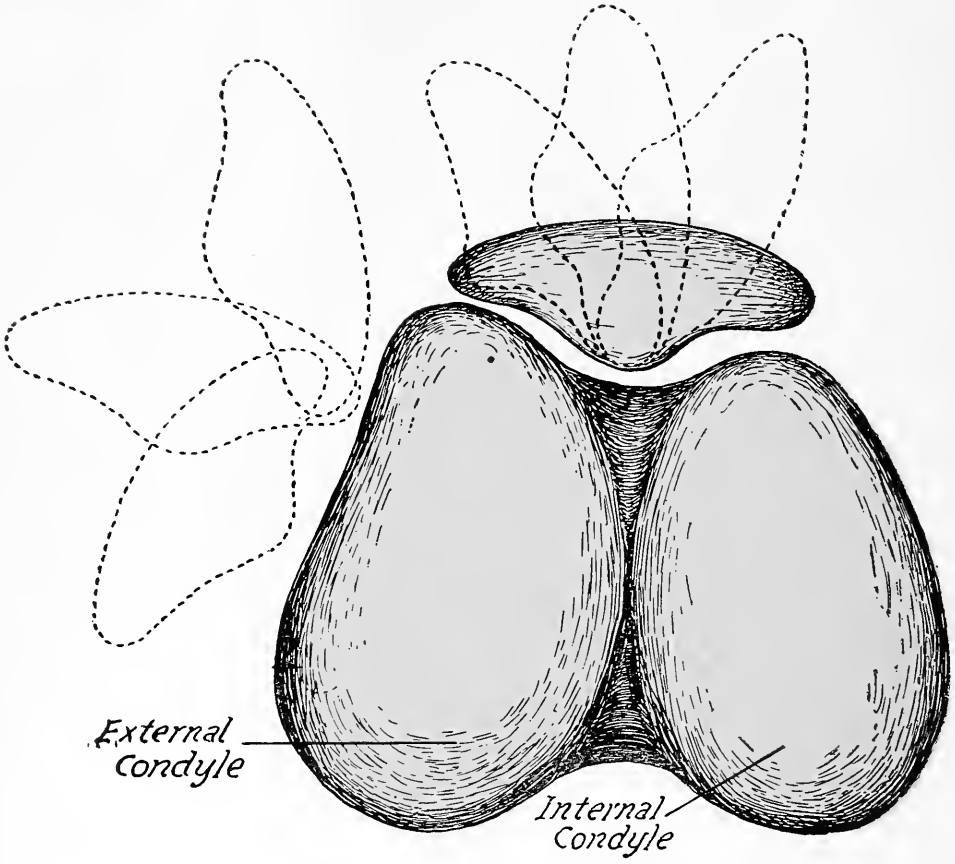

Various Dislocations of the Patella

The various positions assumed by the patella in the several dislocations, and the combinations effected by varying degrees of rotation of the bone itself upon its perpendicular axis are so numerous that to name them or attempt to classify them would lead only to confusion and a complexity of terms.

TREATMENT

The figure represents the patella in its normal position, the dotted outlines of the patella show the most frequent positions assumed when dislocated.

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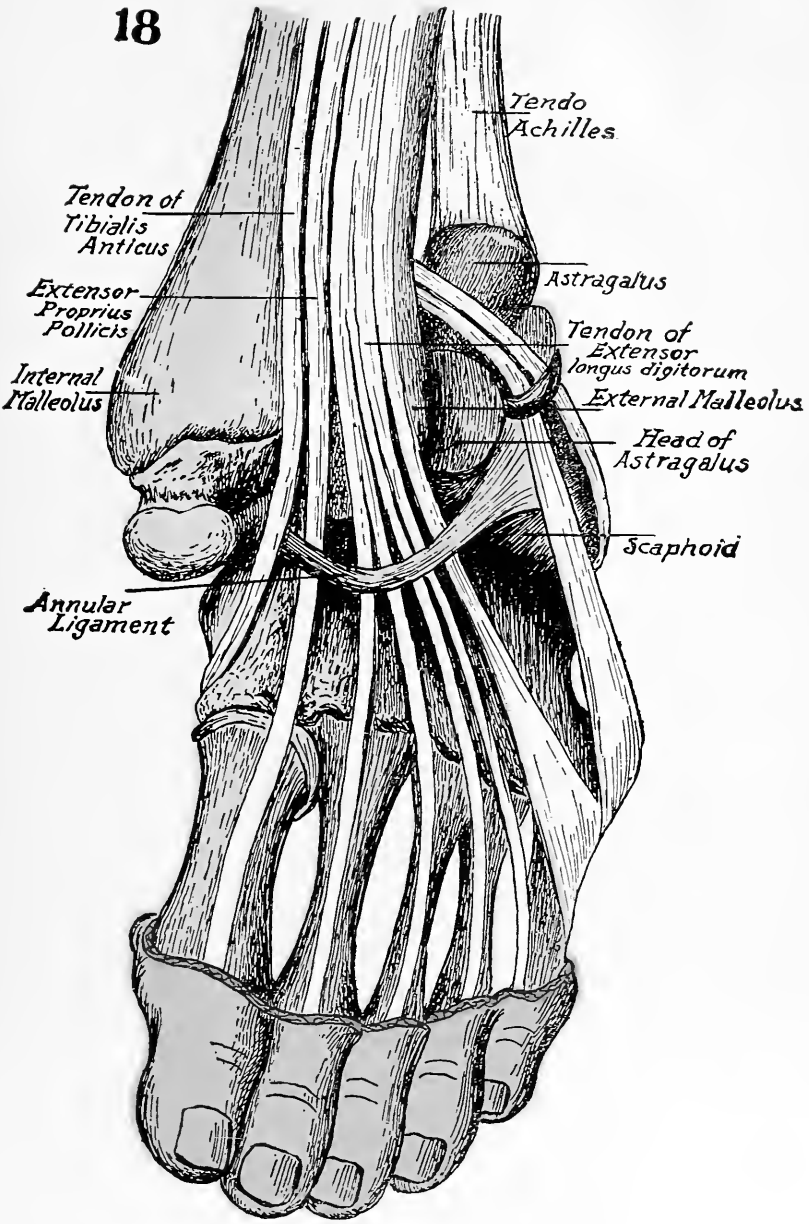

Subastragaloid Dislocation of the Ankle Outward

In the complete outward form the head of the astragalus rests against the inner side of the scaphoid, while the posterior tip is engaged in the groove in the upper surface of the calcaneum; the lower part of the internal lateral ligament, the interosseous ligament, and the astragalo-scaphoid ligament are ruptured, and the posterior and outer part of the external malleolus are generally broken.

TREATMENT

Reduction when accomplished is best made by flexion of the knee, and the application of pulleys with traction downward and forward, together with coaptative pressure on foot and ankle. Removal of the astragalus is necessary in many cases.

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BROMIDIA

FORMULA—Bromidia combines Chloral Hydrate 91 grs., Potassium Bromide 91 grs., Cannabis Indica 1 gr., and Hyoscyamus 1 gr. in each fluid ounce.

INDICATIONS — Sleeplessness, Nervousness, Neuralgia, Headache, Convulsions, Colic, Mania, Epilepsy, Irritability, etc.

It does not lock up the secretions.

DOSE—One-half to one teaspoonful in water or syrup every hour until sleep is produced.

IODIA

FORMULA—Iodia is a combination of active principles obtained from the green roots of Stillingia, Helonias, Saxifraga, Menispermum and Aromatics. Each fluid drachm also represents 2½ grains Iod. Potas. and 1½ grains Phos. Iron.

INDICATIONS—Syphilitic, Scrofulous and Cutaneous Diseases, Dysmenorrhoea, Menorrhagia, Leucorrhoea, Amenorrhoea, Impaired Vitality, Habitual Abortion and General Uterine Debility.

DOSE—One or two teaspoonfuls (more or less, as indicated), three times a day, before meals.

PAPINE

FORMULA—Papine is the anodyne principle of Opium, the narcotic and convulsive elements being eliminated, and is derived from the concrete juice of the unripe capsules of Papaver Somniferum. One fluid drachm is equal in anodyne power to one-eighth grain of Morphia. It produces no tissue changes, no cerebral excitement, no interference with digestion.

INDICATIONS—The same as Opium or Morphine, with less tendency to cause Nausea, Vomiting, Constipation, etc. A safe opiate for children.

DOSE—For adults, one teaspoonful; for children under one year, 2 to 10 drops.

ECTHOL

FORMULA—Contains the active principles of Echinacea Angustifolia, Thuja Occidentalis.

INDICATED—In all breaking down conditions of the fluids, tissues and corpuscles, dyscrasia of the secretions, blood poisoning or tissue disintegration. In typhoid, morbific or eruptive fevers, *small-pox, scarlet fever, erysipelas, etc., carbuncles, boils, gangrenous wounds, ulcers, abscesses, etc.*, stings of insects, bites of snakes, etc. Valuable as a local application in all pustular formations, as well as fresh cuts.

DOSE—One teaspoonful four times a day, or oftener, as indicated.

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